Suitable device for thoracoscopic talc poudrage in malignant pleural effusion.

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HOW TO DO IT

Suitable device for thoracoscopic talc poudrage in malignant pleural effusion

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Abstract Chemical pleurodesis is widely used in symptomatic patients with malignant pleural effusion to relieve symptoms, prevent fluid recurrence, and improve quality of life. Talc has been repeatedly found to be the most effective sclerosant agent, and thoracoscopic talc poudrage has been found to be the most effective pleurodesis technique. A homogeneous talc distribution on the visceral and parietal pleura helps to achieve complete pleural symphysis. We have recently adopted a new suitable sterile device that delivers talc under low and constant pressure, facilitating uniform coating of the whole pleural surface and avoiding inappropriate deposition of talc clumps.

Key words Pleural effusion · Pleural space · Thoracoscopy/video-assisted thoracoscopic surgery (VATS)

Introduction

Malignant pleural effusion (MPE) is a common and serious clinical problem with an estimated incidence as high as 100 per 100,000 population.[1] The majority of patients develop recurrent pleural accumulation with resultant dyspnea, chest pain, cough, or a combination of these symptoms that negatively affect quality of life.

Chemical pleurodesis is widely used as a palliative treatment option in symptomatic patients with MPE. Two recent systematic reviews[2,3] found that the relative risk for successful pleurodesis favored talc over other sclerosants and suggested that thoracoscopic talc poudrage was the technique of choice for pleurodesis in patients with MPE.

Intuitively, a homogeneous talc distribution on the visceral and parietal pleura helps to successfully obliterate the pleural space.

We have recently adopted a new suitable sterile device that delivers talc under low and constant pressure, facilitating uniform coating of the whole pleural surface while avoiding inappropriate deposition of talc clumps.

Case reports

Between August 1, 2009, and October 13, 2009, ten consecutive patients with recurrent malignant pleural effusion (ovarian carcinoma, 1; vulva squamous cell carcinoma, 1; breast cancer, 1; sarcomatoid carcinoma, 1; non-small cell lung cancer, 1; malignant pleural mesothelioma, 5) were treated with thoracoscopic talc poudrage using the new device and were prospectively followed up until June 1, 2010. All patients gave informed written consent, and the study was approved by the local Institutional Review Board.

Thoracoscopic talc poudrage was performed with a uni-portal video-assisted thoracic surgical approach under local anesthesia and conscious sedation. A 10-mm operating thoracoscope was used. Pleural fluid was aspirated, and biopsy specimens of the parietal pleura

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(Fig. 1) were taken for diagnostic purposes. Under visualization, talc was insufflated via a catheter through the working channel of the operating thoracoscope using the new device (Sprink Sestriere; Eurosets, Medolla, Italy) (Fig. 2). Four grams of sterilized graded talc was put into the device.

The device consists of a plastic canister containing a small ball and a pigtail tube (Fig. 2B) through which pressurized air (1.1–1.2 bar) is insufflated after being sterilized by a filter (Fig. 2A). The pigtail tube generates a circular current of high-pressure air, which, with the aid of the entrained ball, creates an homogeneous fine particulate talc mist. Furthermore, a clamp allows the operator to regulate the flow rate (Fig. 2A). At the end of the procedure, talc appears evenly distributed over the pleural surfaces (Fig. 1C).

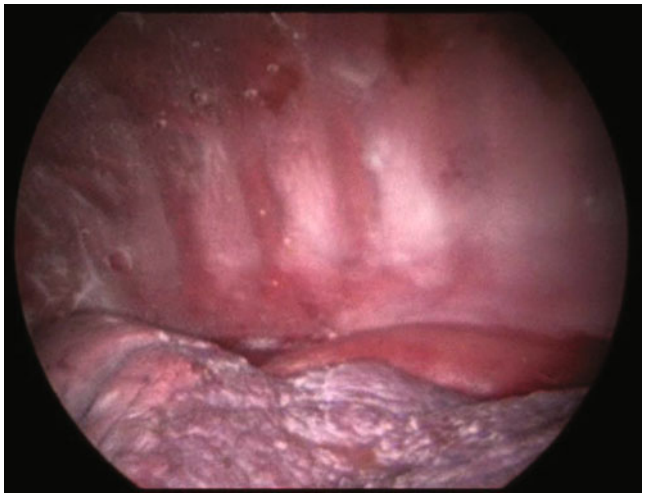

Fig. 1 A 36-year-old woman with recurrent pleural effusion and previous history of metastatic ovarian carcinoma. Thoracoscopic view shows homogeneous distribution of talc on the pleural surfaces

Results

There were no procedure-related complications. The median duration of chest tube use was 3.5 days (range, 2–11 days). The median duration of postoperative hospitalization was 4 days (range, 2–13 days).

No recurrent pleural effusions were observed over a median follow-up of 9 months (range, 7.6–10.5 months).

We compared our results with an historical group of 13 patients (3, malignant mesothelioma; 8, pulmonary adenocarcinoma; 1, B-cell lymphoma; 1, adrenal gland carcinoma) undergoing VATS talc pleurodesis with the system adopted in our department previously between June 1, 2009 and July 30, 2009 (a syringe with talc connected to a pressurized air system). The median duration of chest tube use was 3.0 days (range, 2–19 days). The median duration of postoperative hospitalization was 6 days (range, 3–8 days). Two recurrent pleural effusion were observed over a median follow-up of 7.4 months

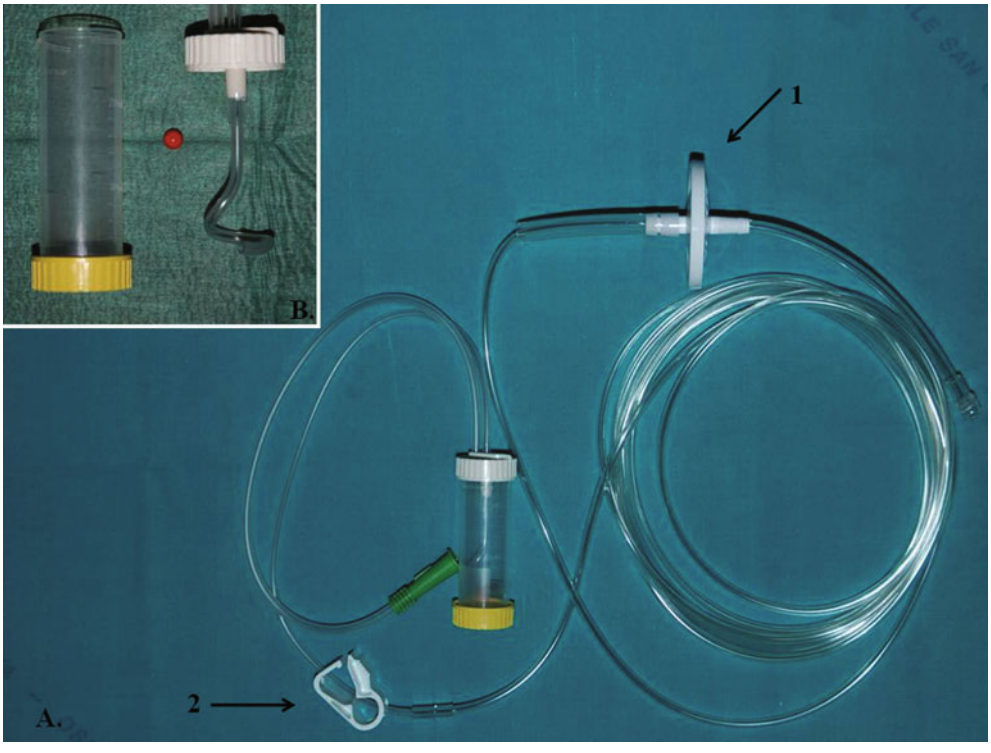

Fig. 2 **A** A view of the system (*1*, the air filter; *2*, the small clump). **B** (*inset*): Plastic canister with the pigtail tube and the small ball, necessary to obtain a whirling flow

(range, 5.8–8.3 months). There was an increase in the successful rate of 15%, but no statistical difference was seen between these two groups (Fisher's exact test, $P = 0.3$)

Discussion

The majority of patients with malignant pleural effusion suffer from progressive dyspnea, chest pain, or cough. Chemical pleurodesis may be used in selected patients with acceptable performance status and life expectancy greater than 3 months to relieve symptoms, prevent fluid recurrence, and improve the quality of life.[1,4] Talc is widely recognized as the sclerosant agent of choice in view of its clinical efficacy, safety profile, and low cost, whereas thoracoscopic talc pleurodesis has been suggested as the most effective pleurodesis technique.[2,3,5] In fact, during video-assisted thoracoscopy, pleural fluid can be removed completely, loculations and adhesions can be divided when present, and talc can be insufflated equally in the pleural space under visual control.

The presence of a "trapped" lung by tumor or fibrin will universally result in an unsuccessful pleurodesis.[1,6] However, in patients who do not have a "trapped" lung, the failure rate of talc pleurodesis, reported in the literature, is still about 10%. In our department, the successful rate, before introducing this new device, was around 80–90%. It is likely that nonhomogeneous or incomplete distribution of talc on the pleural surfaces will contribute to this failure rate.

Over the years, a number of atomizers or ad hoc devices have been used to insufflate talc in the pleural space.[5,7,8] The new device, described here, produces a circular current of a finely adjustable flow of pressurized air, giving rise to a mist of talc particles that facilitates uniform coating of the whole pleural surface and avoids inappropriate deposition of talc clumps on the pleural surface. To obtain a consistent mist of talc particles, not more than 4 g talc should be used. Supplemental talc can be insufflated by using the same apparatus without increasing the cost of the procedure. In the preliminary laboratory model, we noticed that using a small canister and a pigtail tube with the talc connected to a positive pressure system creates an homogeneous pressure in the canister, generating an homogeneous flow in the catheter used for the pleurodesis. This method avoids an instantaneous flow of talc going into the chest without pressure control.

This is only a preliminary report to explain the feasibility of this new device for the thoracoscopic pleurodesis, showing possible advantages: ease of use, homogeneous talc distribution, and lower cost, if more than 4 g talc is required. Further study is needed to definitely demonstrate that more uniform and complete talc delivery on the pleural surface results in improved efficacy of thoracoscopic talc poudrage. In this preliminary report we obtained a successful rate of 100%, compared to the successful rate of 85% in the historical group. This improvement is probably related to the more effective pleurodesis obtained with the new system. There was no statistical difference between these groups; even if there is an increased successful rate, this is probably related to the small number of patients used for the analysis.

Finally, this new device can also be considered a valuable option for video-assisted talc pleurodesis in patients with spontaneous pneumothorax.

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